Visor assembly

The present invention relates to a visor assembly comprising an outer shield and an inner shield spaced therefrom, which inner shield is located within the periphery of the outer shield, a seal/spacer extending around the periphery of said inner shield being fitted between the outer shield and inner shield.

An assembly of this type is disclosed in DE 3 244 152 A1. This publication describes a safety visor assembly consisting of an outer shield and an inner shield. The inner shield is hingeably attached to a helmet construction. These shields are held apart by a rubber ring which is fitted in a seat in one of the shields. The parts are then fixed to one another with the aid of a moulding material. The space between inner shield and outer shield can optionally be filled with a plastic composition in order to increase the strength thereof. Strength is of primary importance for such helmets.

A mechanical construction for holding an inner shield and an outer shield apart is disclosed in PCT Application 9616563 in the name of Derk's Patent B.V. With this structure the outer shield is provided with means for fixing to a helmet or the like. The aim of such a structure is to prevent the visor misting up. With this structure the distance between inner shield and outer shield is guaranteed only in a single location and in principle air containing moisture, water and dirt is able freely to move between inner shield and outer shield. Consequently it is not possible to prevent misting up of the inner shield in an optimum manner under all conditions.

However, if the structure according to DE 3 244 152 A1 were to be used, there would be the disadvantage that both the inner shield and the outer shield would have to be removed in the event of damage.

Such structures with permanent fixing between inner shield and outer shield are also disclosed in US 3 718 937 and EP 0 504 518 A.

The aim of the present invention is to avoid the disadvantages associated with the prior art. That is to say, the aim is to provide a chamber between inner shield and outer shield that can be filled with air or a gas and as far as possible is sealed with respect to the environment. Moreover, the width of such a chamber, that is to say the internal spacing between inner shield and outer shield, must be optimised in order as far as possible to prevent misting up. Furthermore, it must be simple to replace the various components independently of one another. The shapes of the shields must also follow one another as far

as possible, that is to say the shields must lie against one another in the correct manner.

These aims are achieved with a visor assembly described above in that the seal/spacer is stuck to the inner shield and is fitted detachably against said outer shield and in that mechanical fixing means are arranged between the two shields for fixing the latter with respect to one another, said outer shield being provided with means for fixing to a further component, such as a helmet or goggles frame.

According to the invention a visor assembly is understood to comprise any possible application. One important application is that in combination with helmets or other headwear. A further application is that of goggles-like constructions. However, windows in vehicles and instrument covers exposed to the open air, and the like, can also make use of the technology according to the invention. A particular application of the invention lies in helmets, goggles and the like which are used at low temperature. In snowmobiles, for example, there is the problem that moisture exhaled by the driver and/or passengers deposits as ice on the visor as a result of direct heat transfer with the environment. Surprisingly, it has been found that this problem no longer exists with the construction according to the invention.

As can be seen from the above, the spacer is stuck to the inner shield only. Fixing of the inner shield to the outer shield takes place with the aid of mechanical means. Consequently it is possible to release the connection between the inner shield and the outer shield at any desired point in time. This can be the case if, for example, the outer shield has been damaged. Moreover, this can be necessary if the inside of the outer shield or the outside of the inner shield becomes damp or soiled for any reason whatsoever.

According to an advantageous embodiment of the invention, the mechanical fixing means comprise pins fitted on the outer shield which interact with recesses made in the inner shield. Such mechanical fixing means are known in the state of the art for use of a visor assembly with which the inner shield and outer shield are positioned against one another. Such a construction is described in European Patent Application 95937212.9 in the name of Derk's Patent B.V.

In the case of the present invention there is a gap between the inner shield and outer shield.

The pins and recesses interacting therewith, which have been described above, can be further developed depending on the application. For instance, the pins can comprise eccentric pins, as a result of which a closer fit to the position of the recesses can be

obtained. Furthermore, the recesses must be made in attachments, which attachments, in turn, are fitted to the inner shield. If the attachments comprise a resilient construction, any differences in tolerance between pins and recesses which arise either during production or during use can be compensated for.

According to an advantageous embodiment of the invention the seal/spacer is made of silicone material. This acts as a flexible seal between the inner shield and outer shield. Moreover, the compressive strain between the two shields is uniformly distributed. Preferably the silicone material is dry, set and flexible silicone material. The ingress of moisture and the like between the two shields is prevented as far as possible by means of such a construction. Because the spacer is not stuck to the outer shield, some movement relative thereto is possible. This is of importance if the inner shield and outer shield are made of different materials. One example of this is if the outer shield is made of polycarbonate and the inner shield of cellulose acetate. Differences in expansion can be overcome without any problem with the aid of a rubbery elastic seal. If cellulose acetate or other plastics are used it can be important to subject these to a heat treatment in advance. The mechanical properties can be improved by this means. This relates to the material having the same properties in all directions and to restriction of shrinkage when the material is subsequently subjected to high temperature. Cellulose acetate, for example, can be subjected to a heat treatment at approximately 25 – 80 °C for approximately two hours for this purpose.

According to an advantageous embodiment of the invention, the inner shield is made of cellulose propionate. The light transmission of the latter is appreciably better than that of cellulose acetate. The inner shield can acquire improved hydrophilic properties by applying a silicone-based coating thereto, by means of which misting up is counteracted. It is possible to provide the other side with a hard, scratch-resistant coating. By making the inner shield removable with respect to the outer shield it is possible to use such an inner shield in two positions, a first, winter position in which the coating on the inner shield which counteracts misting up faces towards the face of the user and a second, summer position in which the inner shield is fitted precisely the other way round. Of course, in such an embodiment the inner shield will be provided with a rim of flexible material on both sides.

It must be understood that the use of cellulose propionate as described above for an inner shield is not restricted to combination with the technique for fixing to an outer shield.

That is to say, any combination of an inner shield made of cellulose propionate material with an outer shield fixed to one another in any manner whatsoever and with or without the provision of a mutual seal falls within the scope of the present invention.

The distance between the inner shield and outer shield can be adjusted as desired and is preferably greater than 2 mm and more particularly approximately 3 mm. Apart from the fact that the insulation between inner shield and outer shield is optimised by this means, it is also possible in this way to achieve an optimum seal between inner shield and outer shield. It will be understood that sealing between inner shield and outer shield is appreciably more difficult than in the case of constructions which have a permanent closure.

According to a further advantageous embodiment of the invention the outer shield is provided with a recess. The dimensions of this recess at least correspond to the peripheral dimensions of the inner shield. The inner shield can be fitted in such a recess. The mechanical fixing means can be a snap-fit rim or the like in this case. Other constructions for fixing the inner shield in the seat can easily be envisaged by those skilled in the art and fall within the scope of the present invention.

The invention will be explained in more detail below with reference to illustrative embodiments shown in the drawing. In the drawing:

Fig. 1 shows a helmet provided with a first embodiment of the visor assembly according to the invention;

Fig. 2 shows a perspective view of a detail of the visor assembly according to Fig. 1;

Fig. 3 shows a perspective view of a second embodiment of the visor assembly according to the invention; and

Fig. 4 shows a section along the line IV-IV in Fig. 3.

In Fig. 1 the visor assembly according to the invention is indicated in its entirety by 1. An outer visor can be seen, which is hingeably joined to a helmet 3 in a manner not shown in more detail. As can be seen from Fig. 2, the visor assembly 1 consists of an inner shield 6 in addition to the outer shield 2. Inner shield 6 can be secured within the outer shield 2 with the aid of recesses 12 and pins 10 which are fitted in the outer shield 2 and together form retaining means 8. Such a construction is described in more detail in European Application 95937212.9.

According to the invention the inner shield 6 is now provided with a peripheral rim 7 of silicone material. This bead material is stuck to the inner shield but is applied to outer

shield 2 only after it has set, that is to say after the silicone material 7 no longer has any adhesive properties. As a result of the presence of this bead 7 the inner shield 6 is held some distance away from the outer shield 2. Moreover, complete sealing between inner shield 6 and outer shield 2 takes place.

Should it be necessary for any reason whatsoever to take inner shield 6 and outer shield 2 apart this is then possible in a simple manner because no permanent adhesive joint has been produced with the aid of the ring of silicone material 7.

Any other mechanical fixing constructions known in the prior art can be used instead of the fixing means 8 shown. In Figs 3 and 4 a variant of the visor assembly according to the invention is shown and is indicated in its entirety by 21. In this case it is not indicated on what this visor is fitted.

As can be seen, a recess or seat 23 has been made in the outer shield 22. The dimensions of this recess or seat correspond to the external dimensions of the inner shield 26. As in the case of the previous embodiment, inner shield 26 is provided close to the periphery thereof with a rim or ring 27 extending all round. This rim or ring is made of a flexible sealing material. Fixing of inner shield 26 to outer shield 22 takes place with the aid of a simple snap-fit construction. Snap-in lips 24 and 25 are arranged at, respectively, the top and bottom in the outer shield 22. By this means the inner shield 26 can be pushed against the outer shield 22 under some pretension. Spacer 27 provides a seal between inner shield and outer shield, as a result of which ingress of moisture, and consequently misting up of the outer shield 22, can be prevented.

It must be understood that the construction with which the inner shield is somewhat sunken in the outer shield can also be implemented in another way. For instance, it is possible to construct the outer shield with an appreciable thickness, for example 3 mm, close to the periphery. By making a recess, for example 1 mm deep, in this thickness, the inner shield can be accommodated therein. That is to say the outer shield has a lesser thickness at the location of the inner shield. With this arrangement it is possible for a recess made in this way in the outer shield to be delimited on all sides by thicker material of the outer shield. However, it is also possible to allow the lesser thickness of the outer shield to extend over the entire length thereof in a certain direction. The inner shield can be moved relative to the outer shield in that direction and brought into position.

On comparison of the above illustrative embodiments, further variant embodiments will immediately become apparent to those skilled in the art. These are obvious in the light

of the above description and fall within the scope of the appended claims.